REMARKS

Claims 11-24, as amended, are pending for the Examiner's review and consideration. Claims 11 and 17 have been amended to recite that the dye is present in an amount of 0.1 weight percent to 10 weight percent of the information layer, while claim 20 has been amended to recite that the plasticizer is present in an amount of 10 weight percent to 50 weight percent of the information layer. Support for these amendments is found, for example, in the specification at page 5, line 11, original claims 2 and 4, and the various examples.

Applicants appreciate the Examiner's recognition of allowable subject matter in claims 21-24 if those claims were amended to recite the transmittance as being at the wavelength of maximum absorbance. Independent claim 21 has been amended accordingly so that claims 21-24 should now be allowed. No new matter has been introduced by any of the amendments herein, such that entry of the claims is warranted at this time.

Applicants also appreciate the acceptance of the amendments to the specification and the withdrawal of the double patenting rejections based upon U.S. Patent Nos. 6,835,431 and 6,682,799.

Claims 21-24 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement for the reasons set forth on page 2 of the Office Action. In particular, the Office Action states that transmittance is measured at the wavelength of maximum absorption, not the emission wavelength. Claim 21 has been amended to recite a wavelength of maximum absorption. Accordingly, this rejection under 35 U.S.C. § 112, first paragraph has been overcome and should be withdrawn.

Claims 11-12, 14, and 16 were rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,227,495 to Inagaki et al. ("Inagaki") in view of U.S. Patent No. 5,492,792 to Tamura et al. ("Tamura") and U.S. Patent No. 5,639,588 to Huh ("Huh") for the reasons set forth on pages 2-5 of the Office Action.

Inagaki relates to a reportedly novel cyanine dye compound that can be used as a recording dye for use in optical information recording media (Col. 1, lines 7-11). The recording layer includes the cyanine dye and may also include a "quencher" for improving light fastness, a binding agent, an oxidation inhibitor, a UV absorbent, a plasticizer, or a lubricant (Col. 14, lines 42-46 and 61-64). When the binding agent is included in the recording layer, the amount of the cyanine dye may generally be from 0.01 to 99% by weight, preferably from 1.0 to 95% by

weight, based on the weight of the binding agent (Col. 15, lines 14-18). Concentration of the cyanine dye in the recording layer may generally be from 0.01 to 10% by weight, preferably from 0.1 to 5% by weight (Col. 15, lines 18-21). The cyanine dye may be used alone or in combination with other compounds, such as other dyes, including cyanine dyes (Col. 13, lines 40-49).

Tamura is directed to providing an optical recording medium reportedly having excellent sensitivity to light within the near infrared region and greater heat resistance (Col. 2, lines 13-15). The optical recording medium includes a recording layer containing a polymethine dye (Col. 2, lines 36-37). The recording layer may also include a stabilizer (Col. 25, lines 30-31), a binder (Col. 25, 38-40), a plasticizer, an oil agent, or a dispersant (Col. 26, line 66 to Col. 27, line 5). Tamura further teaches that an undercoat layer may be provided between the substrate and the recording layer to improve adhesion between the layers (Col. 27, lines 30-35). The content of the polymethine dye in the recording layer is generally 1% by weight or more, preferably 40 to 100% by weight, more preferably 50 to 100% by weight (Col. 27, lines 11-15). Importantly, Tamura expressly states that with a polymethine dye content of more than 40% by weight, a recording layer exhibiting sufficient light absorption and sufficient reflectance for a reproduction laser beam can be obtained (Col. 27, lines 16-18). The recording layer may include a mixture dispersion containing the polymethine dye and other dyes, including a cyanine dye (Col. 25, lines 17-29). In Example 1-18, a mixed solution of the compound No. (201) and the polymethine compound No. (4) is prepared.

Huh relates to an optical recording medium that includes a substrate, a recording layer of a dye-containing recording material on the substrate, a reflective layer, and a protective layer disposed in sequence on the recording layer, characterized in that the recording layer has a refractive index of 1.7 or less and includes an organic dye and a mixture of two or more polymers which have different thermal properties and are compatible with each other from ambient temperature to 80°C (Col. 2, lines 21-29). Huh teaches that an effective amount of organic dye as a light absorbent should be mixed with the optical recording material (Col. 3, lines 38-42). The preferred addition amount of the dye is 1.0-30 wt.% based on the total polymer material (Col. 3, line 43-46). If the amount of dye is less than 1 wt%., the light absorption is too weak and the power of the recording light would need to be increased uneconomically (Col. 3, lines 46-48). Meanwhile, if the amount exceeds 30 wt%, a part of the dye having low solubility

might not be dissolved and consumption of a large amount of the expensive dye results in uneconomical manufacturing (Col. 3, lines 48-52).

The Office Action concludes on page 4 that it would have been obvious to add a binder, a surfactant, and a plasticizer to Inagaki (specifically Example 7) based on the disclosure that binders are desirable additives to the recording layer in Inagaki, Huh, and Tamura, that plasticizers are desirable additives in Inagaki, and that plasticizers and surface active agents are known to improve the stability and film forming properties of the recording layer in Tamura. Moreover, the Office Action concludes that using a primer such as a thermosetting resin to increase the adhesion and the resistance of the substrate to damage from coating solvents would have been obvious based on the direction in Tamura. The Office Action also maintains that it would have been obvious to form a dual recording media based on the teachings of Inagaki and Tamura.

The Office Action argues that Applicants' previous position that Tamura teaches away from low concentrations of dye neglects the fact that the specific dye being described is a cyanine dye, not the polymethine dye of formula I or II. Furthermore, the Office Action stresses the direction to use cyanine dyes in the amount of 0.1-5% in Inagaki. The Office Action states that while cyanine dyes are a type of polymethine dye, they are not bound by formula I or II of Tamura, and therefore Tamura cannot be construed as teaching away from low concentrations of dye.

Applicants respectfully disagree. Tamura is directed to optical recording mediums containing polymethine dyes of formula I or II (*see* Abstract). Applicants maintain that the dye referred to in Col. 27, lines 15-18 in Tamura is a polymethine compound of formula I or II. The immediately preceding sentence refers to *the* polymethine compound (emphasis added) (Col. 27, lines 12-15), and in a few preceding paragraphs Tamura refers to "the polymethine dye compound of the present invention." It can therefore be inferred that Tamura is referring to the polymethine dye of formula I or II when Tamura states that with a content of more than 40% by weight, a recording layer exhibiting sufficient light absorption and sufficient reflectance for a reproduction laser beam can be obtained (Col. 27, lines 16-18).

In addition, the Office Action points to Example 1-18 of Tamura to show that a cyanine dye (201) is mixed with a polymethine coloring agent. Tamura teaches that the polymethine compounds may be combined with other dyes (Col. 25, lines 17-29). The example

strengthens Applicants' position that Tamura teaches away from the claimed dye concentrations. Tamura already teaches that amounts over 40% of the polymethine dye must be included for its invention to be operative. Example 1-18 includes an additional dye that increases the amount of dye in the recording layer so that even higher concentrations of dye are present.

The Office Action states that the optimization of the amount of dye is taught by Huh, but neglects Tamura's express teaching of higher dye concentrations. While Inagaki and Huh teach lower dye concentrations, Tamura effectively discourages and *teaches away* from this use. It is clearly an improper hindsight rejection for the Patent Office to pick and choose which teachings of Tamura to combine with Inagaki and Huh. Instead, the teaching of Tamura as whole must be applied. "A prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention." *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

Although Tamura states that the concentration of dye in the recording layer is generally 1% by weight or more, Tamura states immediately thereafter that a fluorescent composition ***must*** *have a dye concentration of more than 40%* to exhibit *sufficient* light absorption and reflectance for a reproduction laser beam to be obtained. Thus, Tamura teaches that amounts over 40% of dye must be included for its invention to even be operative, and suggests that lower amounts of dye render the device inoperable. Tamura effectively teaches that the recording layer must have at least 40% dye to function. Indeed, given the overly broad ranges of dye disclosed in Inagaki and Huh, those of ordinary skill in the art would have reasonably relied on the particular and clear teaching in Tamura not to use such low dye amounts in an effort to avoid inoperability. Such ordinary-skilled artisans might even avoid entirely the suspect "teaching" of Inagaki as being so broad as to dye content as to be useless in providing guidance, and instead rely on Huh and/or Tamura.. Therefore, Tamura clearly *teaches away* from the lower amounts of dye taught in Inagaki and Huh, as well as the 0.1 weight percent to 10 weight percent fluorescent dye in the information layer recited in independent claims 11 and 17.

Moreover, Huh expressly rejects the use of the higher dye concentrations of Tamura. Amounts of dye greater than 30 wt%, based on the total polymer material, may result in a part of the dye having low solubility not fully dissolving and consumption of a large amount of expensive dye. This results in uneconomical manufacturing (Col. 3, lines 46-52).

Therefore, there is no motivation to combine Huh with Tamura, and Huh specifically *teaches away* from Tamura as well. It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). One of ordinary skill in the art would not have been motivated to combine the teachings of Tamura with Inagaki or particularly with Huh, because of the distinctly different useful amounts of dye that are taught in the references. The cited references teach away from their combination and Tamura further teaches away from the claimed invention with respect to dye content in the information layer. Applicants therefore respectfully request that this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn, as a *prima facie* case of obviousness has clearly not been made on the record.

Claims 11-14 and 16-19 were rejected under 35 U.S.C. § 103(a) as obvious over Inagaki, in view of Tamura and Huh, and further in view of U.S. Patent No. 5,283,094 to Sasakawa et al. ("Sasakawa") for the reasons set forth on pages 5-6 of the Office Action.

Initially, Sasakawa fails to remedy the hindsight rejection and the deficiencies of the primary and secondary references Inagaki, Tamura, and Huh, as discussed above. Sasakawa fails to provide guidance as to a suitable amount of dye to help remedy the deficiencies. Sasakawa is directed to the amount of solvent remaining in a recording layer and the drying conditions after forming the recording layer to achieve its reported invention (*See, e.g.,* Col. 2, lines 6-10). The drying temperature is preferably 100°C or lower taking the heat resistance of the substrate into consideration (Col. 8, lines 1-3). Sasakawa therefore focuses more on the percentages of solvent in preparing the recording layer, rather than the amount of dye. Sasakawa does, however, state that the concentration of the phthalocyanine *dye solution* in the optical recording medium is usually 0.1-10% by weight, preferably 0.5-7% by weight although it varies depending on types of solvent and methods for forming the recording film(Col. 6, lines 44-48).

Claims 11 and 17 have been amended to recite the dye content in the information layer, and are therefore directed to a final article rather than concentrations of an ephemeral solution used during processing, as taught by Sasakawa. Claim 17 has been amended to clarify that the dye content is the concentration of dye after the heating step.

In addition to the phthalocyanine dye, other compounds, such as known aromatic or unsaturated aliphatic diamine type metal complexes, aromatic or unsaturated aliphatic diol type metal complexes, polymethine dyes, squarylium dyes, naphthoquinone type dyes,

anthraquinone dyes or the like may be added in an amount of preferably 30% by weight or less, more preferably 20% by weight or less (Col. 6, lines 50-56). A soluble resin and additives may be added to a solution of the phthalocyanine dye (Col. 6, line 64 to Col. 7, line 11). Sasakawa teaches to use small amounts of resin and additive, with the combination typically being present in less than 20 weight percent, preferably less than 10 weight percent, and more preferably less than 5 weight percent (Col. 7, lines 16-19). This is because higher amounts of resin and additive are taught by Sasakawa to make the reflectivity and recording sensitivity poor (Col. 7, lines 12-15). In other words, the total amount of the phthalocyanine dye and the above-mentioned dyes capable of being used together with the phthalocyanine dye *in the recording layer* is usually at least 80% by weight, preferably 90-100% by weight, more preferably 95-100% by weight of the recording layer (emphasis added) (Col. 7, lines 20-25).

The Office Action notes that Sasakawa at Col. 6, line 21 to Col. 7, line 19 is concerned with additives to the solution of the phthalocyanine dye and so clearly refers to the coating solution and not the final composition of the dye layer. Sasakawa at Col. 7, lines 20-25, however, clearly refers to the amount of dye *in the recording layer*, which, like Tamura teaches away from the claimed dye content.

As can be seen from the discussion above, Sasakawa fails to make the references combinable. In fact, Sasakawa reinforces Tamura's teaching of large amounts of dye in the recording layer, even expressly disclosing that high amounts of resin and other additives over roughly 20 weight percent result in poor recording sensitivity. Therefore, Sasakawa suggests that dye concentrations of at least 80% are desired to minimize the undesired effects of large amounts, *i.e.,* more than 20%, of resins and other additives. Thus, Sasakawa also *teaches away* from the claimed invention and from the dye content taught by Huh. In fact, Sasakawa simply adds to the confusion in the art as to what dye content is useful for a particular application or end result.

As explained above, there is no motivation to combine Inagaki or Huh with Tamura. There is also no motivation to combine Inagaki or particularly Huh with Sasakawa, because Saskawa recommends using higher amounts of dye to reduce the risk of poor reflectivity and recording sensitivity. Therefore, one of ordinary skill in the art would not have combined Inagaki with Tamura, Huh, and Sasakawa because the references teach away from their combination. Accordingly, Applicants respectfully request that this rejection under 35 U.S.C. §

103(a) be reconsidered and withdrawn, as a *prima facie* case of obviousness has not been demonstrated in the record by the disparate cited references.

Claims 11-19 were rejected under 35 U.S.C. § 103(a) as obvious over Inagaki, in view of Tamura and Huh, and further in view of Sasakawa and U.S. Patent No. 4,904,574 to Suzuki ("Suzuki") for the reasons set forth on pages 6-7 of the Office Action.

Suzuki is concerned with the stabilization of organic base materials to light, and more precisely to the stabilization of organic compounds, especially organic dyes, and polymeric materials, to light (Col. 1, lines 5-10). The organic base materials include dyes that are used for high density optical recording, for example, as recording media for optical discs (Col. 32, lines 3-8). Suzuki discloses diethylene glycol as an organic solvent to be used in conjunction with high boiling solvents for dispersing the dyes (Col. 38, lines 42-43). It teaches that, in general, the dye concentration should be equal to the concentration normally used for color photography (Col. 39, lines 19-21). The presence of the dye in amounts within the range of about 10 to 10^4 micromol per square meter of light-sensitive material is preferred, and most desirably dye is present in an amount within the range of about 100 to 3 $x10^3$ micromol per square meter of light-sensitive material (Col. 39, lines 22-28).

The teachings of Suzuki do not provide the requisite motivation to combine Inagaki with Tamura, Huh, and Sasakawa. Simply put, the teachings of Tamura and Sasakawa are incompatible with the teachings of Inagaki or Huh, and the references therefore teach away from their combination. Suzuki fails to remedy any of the deficiencies noted here, and simply helps illustrate that the rejections involving these references are based on impermissible hindsight.

In addition, Suzuki, Inagaki, Sasakawa, Tamura, and Huh relate to optical recording mediums based on reflective reading methods. For instance, the object of Sasakawa is to enhance the reflective reading and stabilize the reflective signal of an optical disc (*See* Col. 2, lines 38-43 and claim 7). On the contrary, claim 17 recites a method of increasing the fluorescent signal from optical discs. These two tasks are fundamentally different, and the solution to one problem is not typically the solution to the other. Introduction of any additives to a fluorescent composition can cause both an increase and decrease in fluorescence. Sasakawa suggests the use of metal complexes (Col. 6, lines 50-53). Metal complexes will decrease fluorescence, even to the point of completely extinguishing it. Similarly, Inagaki suggests using

heavy metal complexes for stabilization of the reflective signal (Col. 13, line 45), which can completely extinguish fluorescence. The use of similar sub-layers (*i.e.*, the primer layer) in reflective and fluorescent media is not obvious. Aggregation of fluorescent dye in interphase borders can produce non-fluorescent aggregates and lower fluorescence. Likewise, the use of similar polymer mediums in the two different media is not obvious. Fluorescent discs have much more stringent requirements for polymers compared to reflective discs. Finally, the use of similar solvents is also not obvious. In the case of fluorescent media, the speed of solvent evaporation effects the possibility of forming non-fluorescent aggregates that lower fluorescence.

Fluorescent media and reflective media are completely different in two critical aspects -- the reading method and media composition. The differences make technical solutions to problems in the two media completely incompatible and makes comparing them impossible. Thus, the teachings of the cited references do not render the claims obvious.

Accordingly, Applicants respectfully request that this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn as no *prima facie* case of obviousness has been made—or can be made—on the record as to these references.

Claims 11-24 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 9-27 of U.S. Application No. 10/917,384 (U.S. Publication No. 2005/0013966) in view of Tamura. Applicants have submitted a Terminal Disclaimer in response to these rejections. Accordingly, this rejection has been overcome and should be withdrawn.

Accordingly, the entire application is now in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree with the Applicants' position, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of the application.

Respectfully submitted,

3-2-06

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